

CLAIMS

What I claim is:

*B1*  
*Sub A5* 1. A system for supplying an enclosed protected zone having air intake means with an air supply having an inlet and that is filtered to remove contaminants created by chemical, biological or radiological conditions, said system comprising;

10 a) a three-stage air filter apparatus having an input fluidly coupled to said inlet and having an output, said three-stage air filter apparatus having a first, second and third coaxially arranged annular filters, with the first filter being disposed within the second filter and the second filter being disposed with the third filter,  
15 and with the first filter being positioned closest to said input and the third filter being positioned closest to said output, said first filter filtering and removing particulates of at least a first size, said second filter filtering and removing aerosols and particulates of a size  
20 which is less than said first size, and said third filter comprising a gas adsorber for removing gases;

b) a supply fan having an input fluidly coupled to said output of said three-stage air filter apparatus and an output fluidly coupled to said air intake means of said

protected zone, said supply fan supplying a air at a  
sufficient enough flow so as to provide said protected zone  
with a positive pressure.

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5        2. The system according to claim 1 further comprising  
at least one differential transducer connected between the  
input and output of the said three-stage air filter  
apparatus and delivering an output proportional to the  
difference between the pressure sensed therebetween.

10        3. The system according to claim 1, wherein said  
positive pressure of said protected zone is within the  
range from about 0.5 in wg to about 1.5 in wg.

15        4. The system according to claim 3 further comprising  
a transducer connected within said protected zone and  
delivering an output proportional to the pressure sensed  
within said protected zone.

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*Sub A 6* → 5. The system according to claim 4 further comprising  
an alarm device connected to receive the output of said  
transducer and generating an alarm signal when said output  
of said transducer is representative of a pressure of below  
about 0.5 wg.

6. The system according to claim 3, wherein said protected zone has an opening with an input and an output and wherein said system further comprises a pressure  
5 control valve (PCV) fluidly coupled between the input and output of said opening of said protected zone and is dimensioned so as to allow for fluid communication between said input and output when the positive pressure within said protected zone is greater than about 1.5 in wg.

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7. The system according to claim 1 further comprising a coarse filter interposed between said inlet of said supply fan and said input of said three-stage air filter apparatus, said coarse filter filtering and removing  
15 particulates having a size which is greater than said first size.

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8. The system according to claim 7 further comprising a heater interposed between said coarse filter and said input to said three-stage air filter apparatus, said heater being selected so as to elevate the air flowing thereacross to a temperature of greater than about 42°F and having a relative humidity of about 70%.

9. The system according to claim 1 further comprising cooling coils interposed between said output of said three-stage air filter apparatus and said input of said supply fan.

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10. The system according to claim 1, wherein said first and second and third filters of said three-stage air filter apparatus are selected to remove particulates, aerosols and gas created by chemical, biological or radiological conditions.

11. A method for supplying an enclosed protected zone having air intake means with an air supply having an inlet and that is filtered to remove contaminates created by chemical, biological or radiological conditions, said method comprising the steps of;

a) providing a three-stage air filter apparatus having an input fluidly coupled to said inlet and an output, said three-stage air filter apparatus having first, second and third coaxially arranged annular filters, with the first filter being disposed within the second filter and the second filter being disposed with the third filter, and with the first filter being positioned closest to said input and the third filter being positioned closest to said

output, said first filter filtering and removing  
particulates of at least a first size, said second filter  
filtering and removing aerosols and particulates of a size  
which is less than said first size, said third filter  
5 comprising a gas adsorber for removing gases; and

b) providing a supply fan having an input fluidly  
coupled to said output of said three-stage air filter  
apparatus and an output fluidly coupled to said air intake  
means of said protected zone, said supply fan supplying a  
10 sufficient flow of air so as to provide said protected zone  
with a positive pressure within the range from about 0.5 in  
wg to about 1.5 in wg.

12. The method according to claim 11 further  
15 comprising step of arranging at least one differential  
transducer between the input and output of the three-stage  
air filter apparatus and delivering an output proportional  
to the difference between the pressure sensed therebetween.

20 13. The method according to claim 11 further  
comprising the step of arranging a transducer within said  
protected zone and delivering an output proportional to the  
pressure sensed therein.

Sub A8  
14. The method according to claim 13 further comprising the step of providing an alarm device connected to receive the output of said transducer and generating an alarm signal when said output of said transducer is  
5 representative of a pressure of below about 0.5 wg.

15. The method according to claim 11, wherein said protected zone has an opening with an input and an output and wherein said method further comprises the step of:

10 a) providing a pressure control valve (PCV) fluidly coupled between the input and output of said opening of said protected zone; and

c) dimensioning said PCV to allow for fluid communication between said input and output when the  
15 positive pressure within said protected zone is greater than about 1.5 wg.

16. The method according to claim 11 further comprising the step of:

20 a) providing a coarse filter interposed between said inlet of said supply fan and said input of said three-stage air filter apparatus, said coarse filter filtering and removing particulates having a size which is greater than said first size.

17. The system according to claim 16 further comprising the step of:

... a) providing a heater interposed between said coarse  
5 filter and said input to said three-stage air filter  
apparatus; and:

b) dimensioning said heater to elevate the air  
flowing thereacross to a temperature of greater than about  
42°F and having a relative humidity of about 70%.

add A9 →